

## Curriculum Vitae for Hart Smith - Updated November, 2019

### Education

Princeton University, 1984–1988.

Ph.D. in Mathematics, January, 1989.

Thesis supervisor: E. M. Stein.

Thesis title: “The subelliptic oblique derivative problem”.

University of California, Berkeley, 1980–1984.

A.B. in Mathematics, 1984.

### Academic Positions

Professor, University of Washington, 1999–.

Associate Professor, University of Washington 1995–1999.

Assistant Professor, University of Washington 1991–1995.

Visiting Fellow, Princeton University, Fall–Winter 1991–1992.

CLE Moore Instructor, MIT, 1988–91.

### Research Grants (Principal Investigator)

National Science Foundation DMS-1161283, July 2015–June 2019, \$295,800.

Simons Foundation Fellows award, Spring 2013–Winter 2014, \$89,443.

National Science Foundation DMS-1500098, July 2012–June 2015, \$270,000.

National Science Foundation DMS-0654415, July 2007–June 2012, \$281,933.

NSF Focused Research Group DMS-0354668, July 2004–June 2007, \$172,358.

National Science Foundation DMS-0140499, July 2002–June 2007, \$221,942.

National Science Foundation DMS-9970614, July 1999–June 2002, \$64,999.

National Science Foundation DMS-9622875, July 1996–June 1999, \$66,825.

National Science Foundation DMS-9401855, July 1994–June 1996, \$40,000.

National Science Foundation DMS-9203904, July 1992–June 1994, \$41,359.

### Fellowships

Simons Foundation Fellowship, 2013–2014.

Alfred P. Sloan Research Fellowship, 1994–1996.

National Science Foundation Postdoctoral Fellowship, 1988–1992.

Alfred P. Sloan Doctoral Dissertation Fellow, 1987–1988.

National Science Foundation Graduate Fellowship, 1984–1987.

### Committee Positions

Personnel Committee, Autumn 2002–Winter 2020.

Milliman Committee (Chair), Autumn 2014–Spring 2020.

Diversity Committee, Autumn 2019–Winter 2020.

Priorities Committee (Chair), Autumn 2003–Spring 2013.

Appointments, Autumn 2001–Spring 2002 (Chair for Spring 2002).

Executive Committee, Autumn 1999–Spring 2001.

Calculus Oversight and Revision, Autumn 1998–Spring 2001.

### **PhD Thesis Students**

Matthew Blair (2005), Justin Tittelwitz (2013), Yuanlong Chen (2017).

### **Outside Service**

Co-Organizer, special session at the AMS Joint Mathematics Meeting in Seattle, January 7-9, 2016.

Co-Organizer, special session at the AMS Sectional Meeting in Albuquerque, New Mexico, April 18-19, 2010.

Co-Organizer, Seismic Imaging Summer School, UW, August 10–14, 2009.

Editor, Proceedings of the American Mathematical Society, February 2007–January 2011.

AMS special session co-organizer, Eugene, OR, November 12-13, 2005.

Organizer of FRG Conference, University of Washington, July 27–28, 2005.

Organizing Committee, MGA Workshop V: Math Analysis and Multiscale Geometric Analysis, UCLA/IPAM, November 15–19, 2004.

Co-Organizer for 2001 AMS-IMS-SIAM Summer Research Conference on Harmonic Analysis, Mt. Holyoke, June 25–July 6, 2001.

### **Select Invited Lectures**

UC San Diego Analysis Seminar, April 18, 2019.

Nonlinear Waves and Dispersive Equations, Oberwolfach, June 11–17, 2017.

Stanford Geometry Seminar, June 1, 2017.

Microlocal Analysis and Spectral Theory, Sectional AMS Meeting, Pullman, April 22, 2017.

Global Analysis, AMS Joint Mathematics Meeting, January 8, 2016.

Dispersive Partial Differential Equations, Oberwolfach, August 12–16, 2013.

Plenary Lecturer, Conference on Inverse Problems in Honor of Gunther Uhlmann, UC Irvine, June 18–22, 2012.

Plenary Lecturer, Hangzhou Conference on Harmonic Analysis and PDE, Hangzhou, China, June 6–10, 2011.

Invited Lecture, Workshop on Inverse Problems: Theory and Applications, November 8-12, 2010.

Workshop on Spectral Theory and Harmonic Analysis, Canberra, July 13–17, 2009.

First PRIMA Congress, Sydney, August 6–10, 2009.

Bay Area Microlocal Analysis Seminar, Berkeley, April 13, 2009.

Carolina Meeting on Harmonic Analysis and PDE, UNC Chapel Hill, January 30–February 1, 2009.

SIAM Conference on Imaging Science, San Diego, July 7–9, 2008.

Recent Advances in Harmonic Analysis, Fields Institute, Toronto, Canada, February 19–22, 2008.

Mathematics of Oil Exploration, PIMS/SMM meeting, Monterrey, Mexico, October 18-19, 2007.

Harmonic Analysis and Inverse Problems, CRM Luminy, March 26–30, 2007.

## Bibliography for Hart Smith – November 2019

### Publications

- [1] *The subelliptic oblique derivative problem*, Comm. Partial Differential Equations **15** (1990), 97–137.
- [2] *A parametrix construction for a class of subelliptic differential operators*, Duke Math. J. **63** (1991), 343–354.
- [3] *An elementary proof of local solvability in two dimensions under condition  $(\Psi)$* , Annals of Math. **136** (1992), 335–337.
- [4] *A calculus for three-dimensional CR manifolds of finite type*, J. Funct. Anal. **120** (1994), 135–162.
- [5]  *$L^p$  regularity for the wave equation with strictly convex obstacles* (with C. Sogge), Duke Math. J. **73** (1994), 97–153.
- [6] *On Strichartz and eigenfunction estimates for low regularity metrics* (with C. Sogge), Math. Res. Letters **1** (1994), 729–737.
- [7] *On the critical semilinear wave equation outside convex obstacles* (with C. Sogge), Jour. Amer. Math. Soc. **8** (1995), 879–916.
- [8] *A Hardy space for Fourier integral operators*, Jour. Geom. Anal. **8** (1998), 629–654.
- [9] *A parametrix construction for wave equations with  $C^{1,1}$  coefficients*, Ann. Inst. Fourier (Grenoble) **48** (1998), 797–835.
- [10] *A Bessel function multiplier* (with D. Oberlin), Proc. Amer. Math. Soc. **127** (1999), 2911–2915.
- [11] *Averages over curves with torsion* (with D. Oberlin and C. Sogge), Math. Res. Letters **5** (1998), 535–539.
- [12] *Wave equations with low regularity coefficients*, Documenta Mathematica, Extra Volume ICM 1998, II, 723–730.
- [13] *Null form estimates for  $(1/2, 1/2)$  symbols and local existence for a quasilinear Dirichlet-wave equation* (with C. Sogge), Annales Sci. ENS **33** (2000), 485–506.
- [14] *Global Strichartz estimates for nontrapping perturbations of the Laplacian* (with C. Sogge), Comm. Partial Differential Equations **25** (2000), 2171–2183.
- [15] *On global existence for nonlinear wave equations outside of convex obstacles* (with M. Keel and C. Sogge), Amer. J. Math. **122** (2000), 805–842.
- [16] *Global existence for a quasilinear wave equation outside of starshaped domains* (with M. Keel and C. Sogge), Jour. Funct. Anal. **189** (2002), 155–226.

- [17] *Sharp counterexamples to Strichartz estimates for low regularity metrics* (with D. Tataru), *Math. Res. Lett.* **9** (2002), 199–204.
- [18] *Almost global existence for some semilinear wave equations* (with M. Keel and C. Sogge), *Journal d’Analyse* **87** (2002), 265–279.
- [19] *Sharp well posedness results for the nonlinear wave equation* (with D. Tataru), *Annals of Math.*, **162** (2005), 291–366.
- [20] *Almost global existence for quasilinear wave equations in three space dimensions* (with M. Keel and C. Sogge), *J. Amer. Math. Soc.*, **17** (2004), 109–153.
- [21] *Spectral cluster estimates for  $C^{1,1}$  metrics*, *Amer. Jour. Math.* **128** (2006), 1069–1103.
- [22] *Sharp  $L^2 \rightarrow L^q$  bounds on spectral projectors for low regularity metrics*, *Math. Res. Lett.* **13** (2006), 967–974.
- [23] *On the  $L^p$  norm of spectral clusters for compact manifolds with boundary* (with C. Sogge), *Acta Math.* **198** (2007), 107–153.
- [24] *Sharp  $L^p$  bounds on spectral clusters for Hölder metrics* (with H. Koch and D. Tataru), *Math. Res. Lett.* **14** (2007), 77–85.
- [25] *On Strichartz estimates for Schrödinger operators in compact manifolds with boundary* (with M. Blair and C. Sogge), *Proc. Amer. Math. Soc.* **136** (2008), 247–256.
- [26] *On multilinear spectral cluster estimates for manifolds with boundary* (with M. Blair and C. Sogge), *Math. Res. Lett.* **15** (2008), 419–426.
- [27] *A multi-scale approach to hyperbolic evolution equations with limited smoothness* (with M. V. de Hoop, G. Uhlmann and F. Andersson), *Comm. Partial Differential Equations* **33** (6) (2008), 988–1017.
- [28] *Subcritical  $L^p$  bounds on spectral clusters for Lipschitz metrics* (with H. Koch and D. Tataru), *Math. Res. Lett.* **15** (2008), 993–1002.
- [29] *Seismic imaging with the generalized Radon transform: a curvelet transform perspective* (with M. V. de Hoop, G. Uhlmann and R.D. van der Hilst), *Inverse Problems* **25** (2009), no. 2, 025005, 21 pp.
- [30] *Strichartz estimates for the wave equation on manifolds with boundary* (with C. Sogge and M. Blair), *Ann. Inst. H. Poincaré Anal. Non Linéaire* **26** (2009), no. 5, 1817–1829.
- [31] *On abstract Strichartz estimates and the Strauss conjecture for non-trapping obstacles* (with K. Hidano, J. Metcalfe, C. Sogge, and Yi Zhou), *Trans. Amer. Math. Soc.* **362** (2010), no. 5, 2789–2809.
- [32] *Strichartz estimates and the nonlinear Schrödinger equation on manifolds with boundary* (with C. Sogge and M. Blair), *Math. Ann.* **354** (2012), no. 4, 1397–1430.
- [33] *Decoupling of modes for the elastic wave equation in media of limited smoothness* (with V. Brityk, M.V. de Hoop, and G. Uhlmann), *Comm. Partial Differential Equations* **36** (2011), no. 10, 1683–1693.

- [34] *Strichartz estimates for Dirichlet-wave equations in two dimensions with applications* (with C. Sogge and C. Wang), *Trans. Amer. Math. Soc.* **364** (2012), no. 6, 3329–3347.
- [35] *Global well-posedness and scattering for defocusing energy-critical NLS in the exterior of balls with radial data* (with Dong Li and X. Zhang), *Math. Res. Lett.* **19** (2012), no. 1, 213–232.
- [36] *Regularity and multi-scale discretization of the solution construction of hyperbolic evolution equations of limited smoothness* (with S. Holman, M.V. de Hoop, and G. Uhlmann), *Appl. Comput. Harmon. Anal.* **33** (2012), no. 3, 330–353.
- [37] *Sharp  $L^p$  bounds on spectral clusters for Lipschitz metrics* (with H. Koch and D. Tataru), *Amer. J. Math.* **136** (2014), no. 6, 1629–1663.
- [38] *Pointwise bounds on quasimodes of semiclassical Schrödinger operators in dimension two* (with M. Zworski), *Math. Res. Lett.* **20** (2013), no. 2, 401–408.
- [39] *Propagation of singularities for rough metrics*, *Anal. PDE* **7** (2014), no. 5, 1137–1178.
- [40] *Restriction bounds for the free resolvent and resonances in lossy scattering* (with J. Galkowski), *Int. Math. Res. Not. IMRN* 2015, no. 16, 7473–7509.
- [41] *Heat traces and existence of scattering resonances for bounded potentials* (with M. Zworski), *Ann. Inst. Fourier (Grenoble)*, **66** (2016), no. 2, 455–475.
- [42] *On the trace of Schrödinger heat kernels and regularity of potentials*, *Trans. Amer. Math. Soc.*, **371** (2019), no. 6, 3857–3875.
- [43] *Dispersive estimates for the wave equation on Riemannian manifolds of bounded curvature* (with Y. Chen), *Pure Appl. Analysis*, **1** (2019), no. 1, 101–148.
- [44] *Parametrix for a semiclassical subelliptic operator*, to appear in *Anal. PDE*.

## Preprints

- [45] *Uniform resolvent estimates on manifolds of bounded curvature*, submitted for publication.